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10/586,530

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EXAMINER

AKRAM, IMRAN

ART UNIT

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1795

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/586,530	Applicant(s) UKAI ET AL.	
	Examiner IMRAN AKRAM	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 April 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-36 is/are pending in the application.
- 4a) Of the above claim(s) 1 and 4-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 July 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>7/19/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group V, claims 21-35 in the reply filed on 4/2/10 is acknowledged. The traversal is on the ground(s) that there is no burden of search. This is not found persuasive because the instant application is a PCT case and the requirement for restriction is based on a lack of unity as described in the Restriction Requirement filed 3/2/10, not on a burdensome search.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 21-36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 21 recites the limitation "increasing a temperature of a controlled S/C ratio...according to the counted number of times of start up and or stop." This limitation is vague and indefinite. It is unclear what the relationship is between the increase in temperature or S/C ratio and the counted number of times, e.g. whether the relationship is inverse or direct. By stating that the temperature or S/C ratio increases according to the counted number of times, no indication is made as to whether the temperature or S/C ratio is increasing based on an increase in the counted number of times, a

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decrease in the counted number of times, or another possibility. Claims 22-28 depend on claim 21.

5. Claim 22 recites the limitation "increasing the temperature of the reformed gas by said reformed gas temperature adjusting device," but the limitation of "increasing the temperature...of the reformed gas" is found in line 8 of claim 21 on which claim 22 depends. It is unclear as to whether it is the increase recited in claim 21 that is performed by the temperature adjusting device or an independent increase in temperature.

6. Claim 23 recites the limitation "increasing the controlled S/C ratio of the reformed gas by said water supply device and said material feed device," but the limitation of "increasing the...controlled S/C ratio of the reformed gas" is found in line 8 of claim 21 on which claim 23 depends. It is unclear as to whether it is the increase recited in claim 21 that is performed by the water supply device and the material feed device or an independent increase in S/C ratio.

7. Claim 24 recites the limitation "a carbon monoxide concentration of the reformed gas...at a controlled temperature is associated with the controlled temperature." This limitation is vague and indefinite. It is unclear what the relationship is between the CO concentration and the controlled temperature, e.g. whether the relationship is inverse or direct. By stating that the CO concentration is associated with the controlled temperature, no indication is made as to whether CO concentration increases or decreases based on an increase in the temperature, decrease in the temperature, or another possibility.

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8. Claim 25 recites the limitation "a carbon monoxide concentration of the reformed gas...at a controlled S/C is associated with the controlled S/C." This limitation is vague and indefinite. It is unclear what the relationship is between the CO concentration and the controlled S/C, e.g. whether the relationship is inverse or direct. By stating that the CO concentration is associated with the controlled S/C, no indication is made as to whether CO concentration increases or decreases based on an increase in the S/C, decrease in the S/C, or another possibility.

9. Claim 26 recites the limitation "increasing the temperature or controlled S/C ratio of the reformed gas by said water supply device and said material feed device," but the limitation of "increasing the temperature or controlled S/C ratio of the reformed gas" is found in line 8 of claim 21 on which claim 26 depends. It is unclear as to whether it is the increase recited in claim 21 that is based on the output device or an independent increase in temperature or S/C ratio.

10. Claim 26 recites the limitation "increasing the temperature or the controlled S/C ratio...according to display or output of said output device." This limitation is vague and indefinite. It is unclear what the relationship is between the increase and the output device, e.g. what output leads to this increase and how is it related. By stating that the temperature or S/C ratio is associated with the output device, no indication is made as to whether temperature or S/C ratio increases or decreases based on a modification in the temperature, modification in the concentration, or another possibility.

11. Claim 27 recites the limitation "controlling said reformed gas temperature adjusting device to increase the temperature of the reformed gas," but the limitation of

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"increasing the temperature or controlled S/C ratio of the reformed gas" is found in line 8 of claim 21 on which claim 27 depends. It is unclear as to whether it is the increase recited in claim 21 that is based on the output device or an independent increase in temperature.

12. Claim 27 recites the limitation "increase the temperature of the reformed gas...according to the counted number of times of start up and or stop." This limitation is vague and indefinite. It is unclear what the relationship is between the increase in temperature and the counted number of times and counted accumulated operation time, e.g. whether the relationship is inverse or direct. By stating that the temperature increases according to the counted number of times, no indication is made as to whether the temperature is increasing based on a modification in the counted number of times, a modification in the counted accumulated operation time, or another possibility.

13. Claim 28 recites the limitation "controlling said reformed gas temperature adjusting device to increase the controlled S/C ratio of the reformed gas," but the limitation of "increasing the temperature or controlled S/C ratio of the reformed gas" is found in line 8 of claim 21 on which claim 28 depends. It is unclear as to whether it is the increase recited in claim 21 that is based on the output device or an independent increase in temperature.

14. Claim 28 recites the limitation "increase the controlled S/C ratio of the reformed gas...according to the counted number of times of start up and or stop." This limitation is vague and indefinite. It is unclear what the relationship is between the increase in S/C ratio and the counted number of times and counted accumulated operation time, e.g.

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whether the relationship is inverse or direct. By stating that the S/C ratio increases according to the counted number of times, no indication is made as to whether the temperature is increasing based on a modification in the counted number of times, a modification in the counted accumulated operation time, or another possibility.

15. Claim 29 recites the limitation "increasing a temperature of a controlled S/C ratio...according to the counted number of times of start up and or stop." This limitation is vague and indefinite. It is unclear what the relationship is between the increase in temperature or S/C ratio and the counted number of times, e.g. whether the relationship is inverse or direct. By stating that the temperature or S/C ratio increases according to the counted number of times, no indication is made as to whether the temperature or S/C ratio is increasing based on an increase in the counted number of times, a decrease in the counted number of times, or another possibility. Claims 30-36 depend on claim 29.

16. Claim 30 recites the limitation "increasing the temperature of the reformed gas by said reformed gas temperature adjusting device," but the limitation of "increasing the temperature...of the reformed gas" is found in line 8 of claim 29 on which claim 30 depends. It is unclear as to whether it is the increase recited in claim 29 that is performed by the temperature adjusting device or an independent increase in temperature.

17. Claim 31 recites the limitation "increasing the controlled S/C ratio of the reformed gas by said water supply device and said material feed device," but the limitation of "increasing the...controlled S/C ratio of the reformed gas" is found in line 8 of claim 29

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on which claim 31 depends. It is unclear as to whether it is the increase recited in claim 21 that is performed by the water supply device and the material feed device or an independent increase in S/C ratio.

18. Claim 32 recites the limitation "a carbon monoxide concentration of the reformed gas...at a controlled temperature is associated with the controlled temperature." This limitation is vague and indefinite. It is unclear what the relationship is between the CO concentration and the controlled temperature, e.g. whether the relationship is inverse or direct. By stating that the CO concentration is associated with the controlled temperature, no indication is made as to whether CO concentration increases or decreases based on an increase in the temperature, decrease in the temperature, or another possibility.

19. Claim 33 recites the limitation "a carbon monoxide concentration of the reformed gas...at a controlled S/C is associated with the controlled S/C." This limitation is vague and indefinite. It is unclear what the relationship is between the CO concentration and the controlled S/C, e.g. whether the relationship is inverse or direct. By stating that the CO concentration is associated with the controlled S/C, no indication is made as to whether CO concentration increases or decreases based on an increase in the S/C, decrease in the S/C, or another possibility.

20. Claim 34 recites the limitation "increasing the temperature or controlled S/C ratio of the reformed gas by said water supply device and said material feed device," but the limitation of "increasing the temperature or controlled S/C ratio of the reformed gas" is found in line 8 of claim 29 on which claim 34 depends. It is unclear as to whether it is

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the increase recited in claim 29 that is based on the output device or an independent increase in temperature or S/C ratio.

21. Claim 34 recites the limitation "increasing the temperature or the controlled S/C ratio...according to display or output of said output device." This limitation is vague and indefinite. It is unclear what the relationship is between the increase and the output device, e.g. what output leads to this increase and how is it related. By stating that the temperature or S/C ratio is associated with the output device, no indication is made as to whether temperature or S/C ratio increases or decreases based on an modification in the temperature, modification in the concentration, or another possibility.

22. Claim 35 recites the limitation "controlling said reformed gas temperature adjusting device to increase the temperature of the reformed gas," but the limitation of "increasing the temperature or controlled S/C ratio of the reformed gas" is found in line 8 of claim 29 on which claim 35 depends. It is unclear as to whether it is the increase recited in claim 29 that is based on the output device or an independent increase in temperature.

23. Claim 35 recites the limitation "increase the temperature of the reformed gas...according to the counted number of times of start up and or stop." This limitation is vague and indefinite. It is unclear what the relationship is between the increase in temperature and the counted number of times and counted accumulated operation time, e.g. whether the relationship is inverse or direct. By stating that the temperature increases according to the counted number of times, no indication is made as to

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whether the temperature is increasing based on a modification in the counted number of times, a modification in the counted accumulated operation time, or another possibility.

24. Claim 36 recites the limitation "controlling said reformed gas temperature adjusting device to increase the controlled S/C ratio of the reformed gas," but the limitation of "increasing the temperature or controlled S/C ratio of the reformed gas" is found in line 8 of claim 29 on which claim 36 depends. It is unclear as to whether it is the increase recited in claim 29 that is based on the output device or an independent increase in temperature.

25. Claim 36 recites the limitation "increase the controlled S/C ratio of the reformed gas...according to the counted number of times of start up and or stop." This limitation is vague and indefinite. It is unclear what the relationship is between the increase in S/C ratio and the counted number of times and counted accumulated operation time, e.g. whether the relationship is inverse or direct. By stating that the S/C ratio increases according to the counted number of times, no indication is made as to whether the temperature is increasing based on a modification in the counted number of times, a modification in the counted accumulated operation time, or another possibility.

Claim Rejections - 35 USC § 102

26. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

27. Claims 21, 22, 29, and 30 are rejected under 35 U.S.C. 102(e) as being anticipated by Maenishi (US 2005/0129997 A1).

28. Regarding claim 21, Maenishi discloses a process comprising: including a steam reformer with a material supply, water supply (paragraph 2), and shift reactor (paragraph 135); counting the number of times the reformer starts and/or stops (paragraph 104); and modifying the temperature based on the number of starts and/or stops (paragraph 104).

29. Regarding claim 29, Maenishi discloses a process comprising: including a steam reformer with a material supply, water supply (paragraph 2), shift reactor (paragraph 135), and fuel cell (paragraph 39); counting the number of times the reformer starts and/or stops (paragraph 104); and modifying the temperature based on the number of starts and/or stops (paragraph 104).

30. Regarding claims 22 and 30, Maenishi discloses a temperature adjustment means and increasing the temperature based on the number of times of start and/or stop (paragraph 104).

31. Claims 21, 22, 26, 27, 29, 30, 34, and 35 are rejected under 35 U.S.C. 102(b) as being anticipated by Taguchi (US 2003/0175562 A1).

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32. Regarding claim 21, Taguchi discloses a process comprising: including a steam reformer with a material supply and water supply (paragraph 213) and shift reactor (paragraph 17); counting the number of times the reformer starts and/or stops (paragraph 76); and modifying the temperature based on the number of starts and/or stops (paragraph 132).

33. Regarding claim 29, Taguchi discloses a process comprising: including a steam reformer with a material supply and water supply (paragraph 213), shift reactor (paragraph 17), and fuel cell (paragraph 1); counting the number of times the reformer starts and/or stops (paragraph 76); and modifying the temperature based on the number of starts and/or stops (paragraph 132).

34. Regarding claims 22 and 30, Taguchi discloses a temperature adjustment means and increasing the temperature of the reformed gas (paragraph 10).

35. Regarding claims 26 and 34, Taguchi discloses counting the number of times of start and/or stop and increasing the temperature of the system based on this (paragraph 123). It is necessary in Taguchi that the number of times of start and stop be output in some manner for the device to operate.

36. Regarding claims 27 and 35, Taguchi discloses counting the number of times of start and/or stop and increasing the temperature of the system based on this (paragraph 123) and increasing the temperature of the reformer based on time accumulated (paragraph 52).

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37. Claims 21-24 and 29-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Ukai (US 2001/0002248 A1).

38. Regarding claim 21, Ukai discloses a process comprising: including a steam reformer with a material supply, water supply, and shift reactor (paragraph 47); counting the number of times the reformer starts and/or stops (paragraph 139); and modifying the temperature based on the number of starts and/or stops (paragraph 18).

39. Regarding claim 29, Ukai discloses a process comprising: including a steam reformer with a material supply, water supply, and shift reactor (paragraph 47) and fuel cell (paragraph 2); counting the number of times the reformer starts and/or stops (paragraph 139); and modifying the temperature based on the number of starts and/or stops (paragraph 18).

40. Regarding claims 22 and 30, Ukai discloses a temperature adjustment means and increasing the temperature of the reformed gas (paragraph 18).

41. Regarding claims 23 and 31, Ukai discloses increasing the s/c ratio of the reformed gas by modifying the water supply and material feed supply (paragraph 82).

42. Regarding claims 24 and 32, Ukai discloses an air source for the shifted reformat (paragraph 95) and a CO selective oxidation (purifier) unit (paragraph 12), further comprising the steps of: measuring controlled temperature data and corresponding it to the number of times of start and/or stop and CO concentration (paragraph 185); selecting the temperature based on the number of starts and/or stops and consequently choosing the CO concentration based on this temperature (paragraph

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185); and modifying the air flow rate to the reformer based on a temperature detector of the reformer (paragraph 53).

Claim Rejections - 35 USC § 103

43. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

44. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

45. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

46. Claims 25, 28, 33, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ukai as applied to claims 21 and 29, respectively.

47. Regarding claims 25 and 33, Ukai discloses an air source for the shifted reformat (paragraph 95) and a CO selective oxidation (purifier) unit (paragraph 12), further comprising the steps of: measuring controlled temperature data and corresponding it to the number of times of start and/or stop and CO concentration (paragraph 185); selecting the temperature based on the number of starts and/or stops and consequently choosing the CO concentration based on this temperature (paragraph 185); and modifying the air flow rate to the reformer based on a temperature detector of the reformer (paragraph 53). Ukai discloses increasing the S/C ratio of the reformed gas (paragraph 82), but not that this increase is based upon the number of times of start/stop or the accumulated process time. Ukai does, however, disclose that the CO concentration of the shift effluent increases with start and stop of the reformer (paragraph 139) and that an increase in S/C ratio decreases the CO concentration (paragraph 82). Carbon monoxide is a well-known catalyst poison and should be minimized (paragraph 8). It should have been obvious to one having ordinary skill in the art at the time of invention to increase the S/C ratio as done in Ukai when the apparatus is started and/or stopped over a period of time to minimize the CO formed as suggested in Ukai.

48. Regarding claims 28 and 36, Ukai discloses increasing the S/C ratio of the reformed gas (paragraph 82), but not that this increase is based upon the number of

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times of start/stop or the accumulated process time. The measurement of time is inherent to Ukai, as it is any process in which time is being taken into account. Ukai does, however, disclose that the CO concentration of the shift effluent increases with start and stop of the reformer (paragraph 139) and that an increase in S/C ratio decreases the CO concentration (paragraph 82). Carbon monoxide is a well-known catalyst poison and should be minimized (paragraph 8). It should have been obvious to one having ordinary skill in the art at the time of invention to increase the S/C ratio as done in Ukai when the apparatus is started and/or stopped over a period of time to minimize the CO formed as suggested in Ukai.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IMRAN AKRAM whose telephone number is (571)270-3241. The examiner can normally be reached on 10-7 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/I. A./

Examiner, Art Unit 1795

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795